ing an inferior product of little commercial value. There is a reference on p. 384 to "Spanish oil of hops" or "Cretan oil of marjoram," described as obtained from *Origanum hirsutum* and *O. creticum*. This appears to refer to the material better known in this country as "Cretan origanum" or "red thyme" oil, which is generally believed to be obtained from *Origanum hirtum*. The tabular statement of the constituents of volatile oils is incomplete in some respects; thus, under "basil oil," there is no reference to the terpene ocimene isolated by van Romburgh from this source in 1901; and the information given under the head of "applications" in these tables is in some cases rather inadequate.

There is a reference in the list of "errata and addenda" to the recent confirmation by the Philippine Bureau of Science of Trimen and Bentley's statement that "elemi" is obtained from *Canarium luzonicum*, but, curiously enough, the generic name is wrongly given as Conarium.

The arrangement of the subject-matter adopted facilitates reference to the information given regarding most of the products described, but it would have been an advantage if a fuller index had been provided.

As a guide to the analysis of commercial vegetable products this book fully maintains the high standard set in previous editions, and those concerned in its revision are to be congratulated on the satisfactory way in which they have accomplished their work.

T. A. H.

## SCIENTIFIC ASPECTS OF PHOTOGRAPHY.

*Investigations on the Theory of the Photographic Process.* By Dr. S. E. Sheppard and Dr. C. E. Kenneth Mees. Pp. x+342. (London: Longmans, Green and Co., 1907.) Price 6*s*. 6*d*. net.

Chapman Jones

DURING the last four years the authors have been working with the object of preparing theses for their degrees according to the regulations of the University of London, and in this volume they present in order the records of their work by republishing together their communications to several scientific societies. That particular branch of photography that the authors refer to as *the* photographic process is the exposure, development, fixation, and sensitometry of gelatino-bromide plates—in short, negative making as now understood, but without reference to the after-treatment of the fixed plate by such processes as intensification, or to such collateral matters as the production of developer stains.

As indicated by the title, the volume is theoretical rather than practical, though the results often have an important practical significance. The subjects are dealt with from the point of view of what is now understood as physical chemistry, and the work is described in the language of that branch of science. This will make the volume probably more acceptable to students interested in photography who have devoted themselves specifically to physical chemistry, but it imposes a serious difficulty in the way of those who have not. This difficulty is increased by the constant use of symbols instead of words in the text. We would suggest the addition of a glossary giving the exact meaning of each of the symbols used.

Some of the apparatus used appears to be disadvantageously complex. For measuring opacities a spectrophotometer is employed, though dispersion of the light is unnecessary, and appears to be undesirable, for it must add sources of error. The authors use the bright green part of the spectrum, but do not say why they throw away the rest. They recognise the fact that the light transmitted by the silver deposits in films is largely scattered, and that their instrument takes very little cognisance of scattered light. They apparently assume that the scattered light generally bears a constant proportion to the whole, but it is very doubtful whether such an assumption is well founded. On certain occasions the authors endeavour to obviate the error due to scattering by making the film itself the practical light-source by means of a diffusing medium, placed in contact with it. Opal glass, which they use, is probably the best diffusing medium available, but the present writer does not call to mind any proof that it is thoroughly effective for such a purpose. Other methods of measurement are well known that do not suffer from these drawbacks.

The authors deal with many questions that are of a very debatable character, and it in no sense belittles their work to say that they remain debatable. They adopt the "germ" theory of the developable image, but limit the effect of each germ to the grain or nodule of which it forms a part. The "suspicion of a vicious circle in the argument" that the authors refer to in connection with the "molecular strain" theory is, we fear, much more widely applicable than they appear to realise. The authors remark that "it may be said of the physical theories that they shirk a real explanation by treating the phenomena to be explained as a quality of the physical modification of the halide"; to which one might reply that those who advocate the chemical theories assume a decomposition of which there is no evidence. And so it remains a matter of opinion as to which is the safer and more useful hypothesis. We make only one other observation, namely, that it seems undesirable to speak of the *law* of constant density ratios, when, as the authors themselves admit, it is "frequently not followed." When this "law" was first propounded by Messrs. Hurter and Driffield they maintained that it was really a *law*, which it was very difficult, if possible, to get away from.

This volume will find a place, which it will worthily fill, in the libraries of all who are interested in the scientific aspects of photography, because it contains the record of a series of carefully conducted experiments under stated conditions, and gives copious references to the literature of the subject.

C. J.

## OUR BOOK SHELF.

*Surgical Instruments in Greek and Roman Times.* By Dr. John Stewart Milne. Pp. xii+187; illustrated. (Oxford: The Clarendon Press, 1907.) Price 14*s*. net.

Dr D'Arcy Power

BOTH the author and the Clarendon Press are to be congratulated on the issue of this very valuable work—Dr. Milne because it represents work well done, and the Press on account of the successful manner in which

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the fifty-four plates of surgical instruments have been reproduced.

The book has grown out of a thesis written by Dr. Milne for the degree of doctor of medicine at the University of Aberdeen. It shows him to be a scholar of no mean capacity, and a fit member of a profession which used to be a great deal more learned and much less practical than it is at the present time. Knowledge about ancient surgical instruments is singularly scattered. There are descriptions of them in the medical and surgical writers of classical times, and there are remains of the instruments themselves in most of the national museums of Europe and America. But in modern times very little attention has been devoted either to the instruments or to their descriptions, and those who still read descriptions of the operations in the classical authors have either been contented to imagine the instruments with which they were performed or have had to draw upon their recollection of what they saw at Naples. Dr. Milne has now removed this reproach, and any intelligent surgeon, even though he be ignorant of Greek and should know but little Latin, can follow easily the manipulations of the older surgeons. Some day, perhaps, a surgeon with an archæological bias will do for Egyptian surgery what Dr. Milne has accomplished for Greece and Rome. Dr. Milne describes the instruments under the general headings of knives, probes, forceps, bleeding cups and clysters, cauteries, bone and tooth instruments, bladder and gynæcological instruments, sutures, and the portable outfit which was necessary for the surgery of so migratory a race as the Romans. In an appendix is an inventory of the chief instruments which Dr. Milne has seen in the various European museums, and a bibliography of the subject, short but apparently complete. There are no less than three indices, the first an index of subjects, the second a Latin index, and the third in Greek. Dr. Milne has done his work so well and so accurately that as this monograph is the first dealing with the subject it must remain for a long time the standard authority until further finds prove or disprove some of the disputable conclusions drawn by the author. The monograph presupposes a considerable amount of knowledge on the part of the reader. He must in the first place be skilled in the practice of his profession, he must be interested in its antiquities, and he must be a fair classic. These qualifications being granted, the book is most excellent reading, and throws abundant light, not only on the subject of which it treats, but also on many collateral points.

*Diptera Danica. Genera and Species of Flies hitherto found in Denmark.* Part I. By William Lundbeck. (Copenhagen: G. E. C. Gad; London: William Wesley and Son, 1907.) Price 4*s.* 6*d.* net.

W. F. Kirby

THIS work is expected to be completed in about ten parts; and the first part is accompanied by a portrait of R. C. Stæger, an eminent Danish dipterist. The book is written in English, and as it appears to be very carefully done will prove very useful to English entomologists who take up the study of Diptera, which has been more neglected in England than any other order of insects, and respecting which we possess no complete work at present; though most European countries possess good monographs of Diptera in their own languages. The introduction relates chiefly to structure, illustrated by figures of structure and neuration. The other text-illustrations represent details of structure, such as heads, wings, palpi, &c. One term is new to us—the "yowls," which from the context seems to apply to the lower part of the face. The English is very good, but somewhat stilted, and occasionally rather unfamiliar words are used, such as "kinks" and "kneeformed."

There is no general table of families, which we regret; but detailed tables are given of subfamilies, genera and species. The descriptive part of the book appears to be very good, as well as the accounts of habits, transformations, and localities. There is even a table of the larvæ of the genera of Stratyomiidæ, the first family included in part i., the others being Xylophazidæ, Cœnomyiidæ, Tabanidæ, Leptididæ, and Acroceridæ.

It appears that the last estimate of the number of Danish Diptera was given by Zetterstedt in 1855 as 1439, to which Prof. Lundbeck will doubtless be able to add considerably by the time that his work is completed. The number of British species is probably somewhere between 2500 and 3000; and a considerable proportion of the Danish species probably also occur in the British islands, though the latter may be expected, when the Diptera of both countries are fully known, to possess a richer fauna than Denmark, owing to the greater extent and more varied character of the country.

## LETTERS TO THE EDITOR.

*[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.]*

### Radiation of Meteors.

THE shower of November Andromedids which occurred in 1885 exhibited a very large area of radiation, the flights being directed from a region variously estimated from 7° to 15° diameter. The Draconids of August, with a radiant near *o* Draconis and centre at about 290°+60°, appears to exhibit a similar feature, for the rich shower this system presented in 1879 had a very ill-defined radiant. An active shower of Taurids seen on November 2, 1886, also formed a very dispersed or scattered radiant.

The Draconids alluded to above returned rather plentifully this year between August 15 and 28, and they exhibited the same indefiniteness of radiation as in 1879. The feature is an interesting one, but it is very difficult to investigate it properly because of the errors of observation and mistakes in attributing meteors to their correct systems.

As a rule, it may be accepted as a general fact that showers of slow meteors have more diffused radiants than the swift meteors. I have often found the radiant points of the Perseids, Orionids, and Leonids very contracted and exact centres, while certain displays of slow meteors have proved rather puzzling to me in fixing their correct positions owing to the evident diffuseness in the intersections of the paths.

W. F. DENNING.

Bishopston, Bristol, August 30.

### Experiment on the Rusting of Iron.

IN view of recent work on the rusting of iron, the following simple experiment will be of interest. It is the result of a number of attempts to devise a simple method—for class-demonstration purposes—of showing that carbon dioxide is necessary for the rusting of iron.

A 500 c.c. flask was taken, and into it were put about 100 c.c. of 15 per cent. caustic potash solution. A partially bored sound cork was inserted in the neck, and the flask shaken occasionally for two days. Then a piece of bright iron wire (a long nail is suitable) was, after boiling in distilled water, pushed through the unbored portion of cork, leaving about an inch outside. After four months the iron inside shows no sign of rust, whilst that outside was rusted in as many days.

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